

Modern Engineering

January 18 | Day 7

Prudential Financial



Whilst we wait....

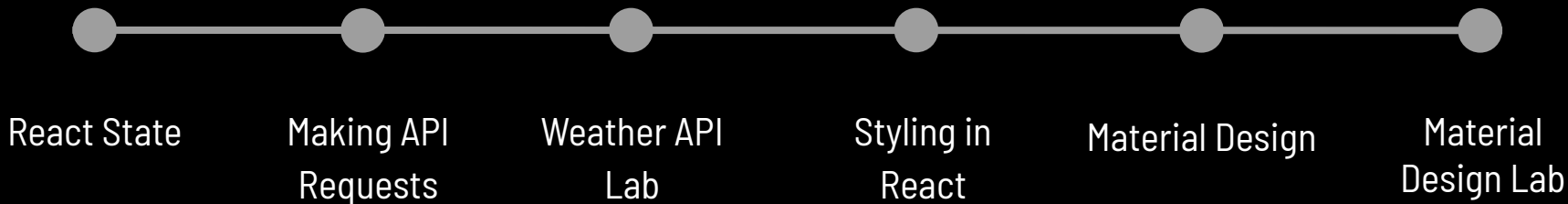
In chat write:

Your name - role and a recent impulse buy.

**Let's give everyone
a min or two to join**



LESSON ROADMAP



MEF MODULE 3 DAY 7: State and Styling in React

Schedule	
9:00–9:15 am	Welcome and Warm-Up
9:15–10:15 am	State Management in React, Mood Points
10:15–10:45 am	Blog and Posts State
10:45 am - 12:30 pm	To-Do List Props and State
12:30–1:30 pm	Lunch
1:30-1:45 pm	Making API Calls/Weather Report
1:45–2:45 pm	Weather Bonus Features
2:45 - 3:45 pm	Material UI Walkthrough
3:45 - 4:50 pm	Material UI Lab
4:50–5:00 pm	Bring It Home



LEARNING OBJECTIVES

1

Manage application state using React's **State hook**

2

Make an API request from a react application

3

Apply **styling** strategies to react components

4

Leverage the **Material Design** UI library in a react application



State and Styling in React



State Management in React



State

- In React, state is an object that holds data that can change within a component.
- State **allows a component to track changes and respond to user interactions** and other events.
- The state can be updated by calling a setter function, which will trigger a re-render of the component and its children.

```
import React, { useState } from "react";

function ExampleComponent() {
  const [count, setCount] = useState(0);

  return (
    <div>
      <p>Count: {count}</p>
      <button onClick={() => setCount(count + 1)}>Increment</button>
    </div>
  );
}

export default ExampleComponent;
```

Image 15: Introduction to Hooks using useState

State vs. Props

State

Initialized within a component

Mutable, but only with special methods

Changes trigger re-render

VS.

Props

Passed down from parent

Immutable

Cannot trigger a re-render

The State-UI Cycle

1. The user is shown an initial page with data and forms/controls
2. Event listeners are triggered when the user activates the given controls
3. The event listeners manipulate the application's state
4. React notices state has changed, and re-renders the relevant components



Getters and Setters with useState

In a react component, state is generated using a special type of function called a **hook**, which we'll discuss next.

The result of calling the **useState** function gives you two values:

- A variable allowing **read** access to the value stored in state
- A **setter** function that allows you to reset the value to a new input

```
const [username, setUsername] = useState("")
```

- **Hooks** are a way to **add state and other React features to functional components** in React.
- Hooks allow functional components to be used like class components.
- Before hooks were introduced to react v16.8 in 2019, state and functionality was only possible in class components.

```

1  import './styles.css';
2  import { useState, useEffect, useRef } from 'react';
3
4  export default function App() {
5    const [count, setCount] = useState(0);
6    const [inputText, setInputText] = useState("");
7    const [historyList, setHistoryList] = useState([]);
8
9    const imageRef = useRef(null);
10   const primaryImg =
11     "https://images.freeimages.com/images/small-previous";
12   const secondaryImg =
13     "https://images.freeimages.com/images/small-previous";
14
15   console.log("Results array: ", inputText);
16   console.log("useRef", imageRef);
17
18   const [users, setUsers] = useState([]);
19   async function getUsers() { ...
23   }
24
25   useEffect(() => {
26     console.log("useEffect called");
27     getUsers();
28   }, [inputText]);
29

```



Effect

- Mechanism for triggering a piece of code to run after each *render*.
- **Effects are a way to handle side effects** in React functional components.

```
const [users, setUsers] = useState([]);
async function getUsers() {
  const response = await fetch("https://jsonplaceholder.typicode.com/users");
  const users = await response.json();
  setUsers(users);
}

useEffect(() => {
  console.log("useEffect called");
  getUsers();
}, [inputText]);
```

Image 16: Effect Functional Component

Commonly Used Hooks

Hook	Definition
useState():	Used to add state to a functional component. It takes an initial value as an argument, and returns an array containing the current state and a function to update it.
useEffect():	Used to run side effects such as fetching data , updating the document title, or subscribing to a message service. It takes a function that contains the logic for the effect and an array of dependencies as arguments.
useContext():	Used to consume data from a context object. It takes the context object as an argument and returns the current value of the context.



Let's practice initializing and updating state in response to user actions



Partner Exercise:

Blog State and Forms

30 minutes



Practice using a state-based value and updating it in response to user actions





To Do List: Props and State

Let's solidify these foundational concepts in the 03 and 04 READMEs by creating the start of a To Do List application



Lunch

State and Styling in React



Making API Calls from React

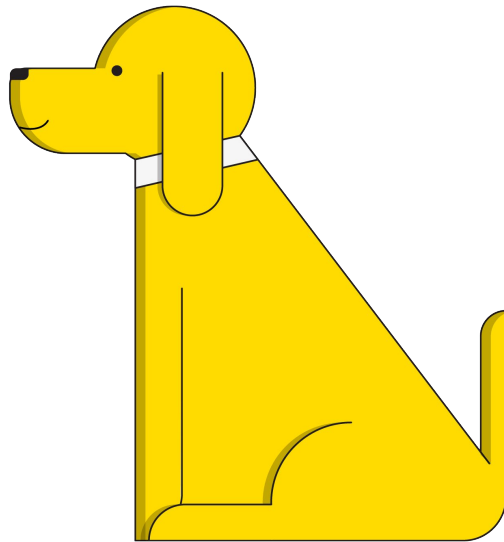


Fetching Data With `fetch()`

From react or any front-end webpage, you can send an HTTP request using JavaScript's built-in **`fetch()`** function, which accepts the destination URL as a parameter and sends a GET request to it:

```
const response = await fetch(url);
```

You can also provide a second parameter, an options object, for requests with different HTTP methods or requiring special headers.



Asynchronous Code With Async/Await

API calls are **asynchronous** code. Because we have no idea how long the response will take to return, we have to **await** the result. We can do so using two keywords that come as a pair: **async** and **await**.

```
async function askForData(){  
  const response = await fetch(url);  
  const data = await response.json();  
}
```



Guided Walk-Through: Weather Report

We'll create a searchable weather application that relies on the WeatherStack API to fetch and display weather information to the user based on their search input.

Extending the Weather Report



Let's add bonus features to the Weather App to continue practicing the use of forms and API calls in React applications



Continue practicing the use of forms and API calls in React applications. Feel free to create a new app or continue adding on to the Weather App we created.

- [Chuck Norris Joke API Exercise](#)
- [Dog CEO API Exercise](#)
- [Giphy API Exercise](#)
- [Weather App Additional Features](#)

Recap

- State vs. Props
- useState
- fetch



Any Questions

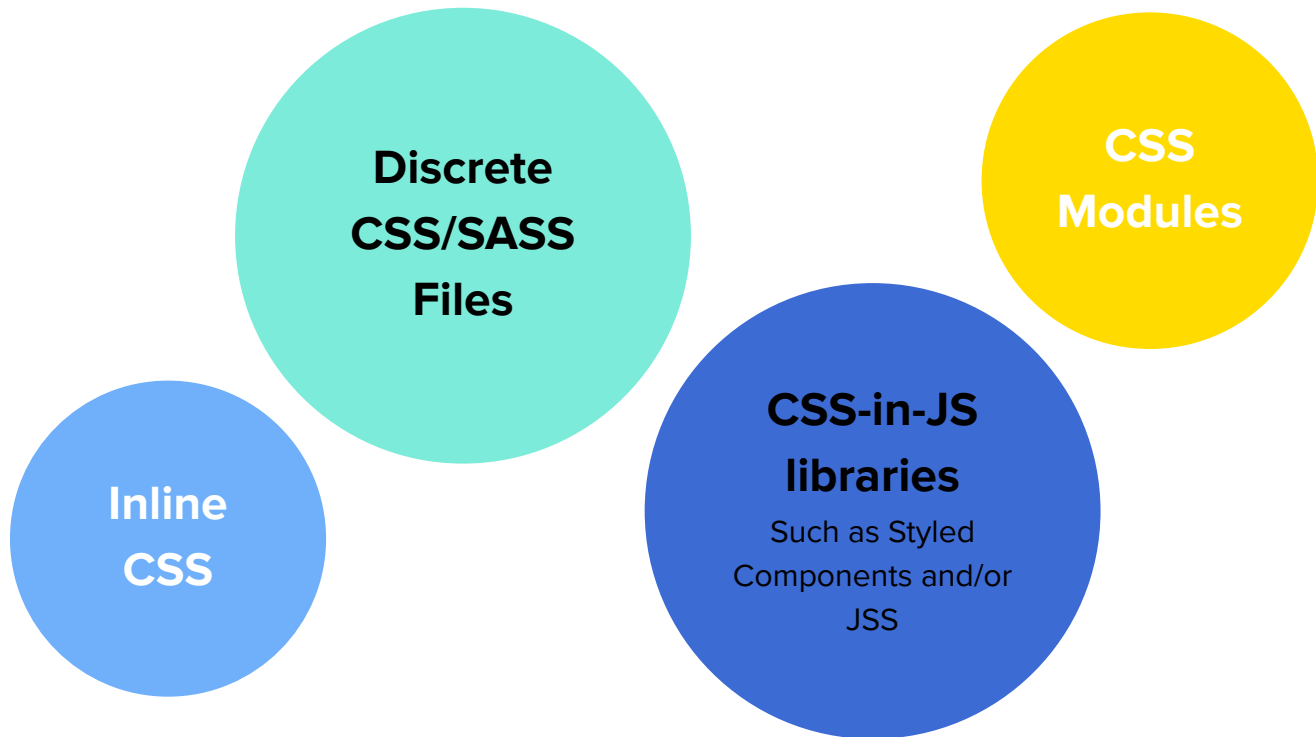
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Styling Approaches in React



Styling Approaches



Styling Approaches: Pros and Cons

Approach	Pros	Cons
Inline CSS	<ul style="list-style-type: none">• Direct control over a specific HTML element.• Quick and easy to apply to a single element.	<ul style="list-style-type: none">• Increases HTML code size and complexity.• Makes it difficult to maintain a consistent look and feel across multiple pages.• Lack of reusability, as the same styles cannot be applied to multiple elements or pages.• Styles cannot be overridden easily.

Styling Approaches: Pros and Cons (con't)

Approach	Pros	Cons
Discrete CSS/SASS Files	<ul style="list-style-type: none">• Reusability of styles across multiple pages or elements.• Easy to maintain and update a consistent look and feel across the site.• Better organization of styles.• Improved performance due to caching.• Ability to use advanced features like variables, functions, and mixins.	<ul style="list-style-type: none">• Initial setup and setup of a build system may be complex.• Requires a separate HTTP request for each CSS file, increasing page load time.• Can make it difficult to quickly apply styles to a specific HTML element.• Requires coordination between HTML, CSS, and JavaScript files.

Styling Approaches: Pros and Cons (con't)

Approach	Pros	Cons
CSS-in-JS Libraries	<ul style="list-style-type: none">• Scoped styling, reducing the risk of style conflicts.• Dynamic styling based on component state or props.• Improved modularity and encapsulation.• Access to JavaScript functions and variables in CSS.• Easy management of media queries and other complex styling.	<ul style="list-style-type: none">• Increased bundle size due to the need to include a library.• Requires a learning curve for developers unfamiliar with the library.• May result in reduced performance due to the overhead of JavaScript styling.• Limited browser compatibility for some libraries.• May make it difficult to collaborate with designers who are unfamiliar with the library.

Styling Approaches: Pros and Cons (con't)

Approach	Pros	Cons
CSS Modules	<ul style="list-style-type: none">• Encapsulation of styles, reducing the risk of style conflicts.• Dynamic composition of styles based on component state or props.• Reusability of styles across multiple components.• Improved modularity and organization.• Easy management of media queries and other complex styling.	<ul style="list-style-type: none">• Requires a build step to compile CSS modules into CSS.• Limited browser compatibility without a build step.• Increased bundle size due to the need to include a CSS module in the JavaScript code.• Can make it difficult to collaborate with designers who are not familiar with the CSS Modules concept.• Limited browser dev tools support for debugging and inspecting CSS Modules.



**Of the styling approaches
we've outlined, which would be
the most appropriate for
Prudential?**



**Come off mute
and discuss!**

**Inline
CSS**

**Discrete
CSS/SASS
Files**

**CSS-in-JS
libraries**

Such as Styled
Components
and/or JSS

**CSS
Modules**

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Material Design



Material Design: Make Your Apps Googlier

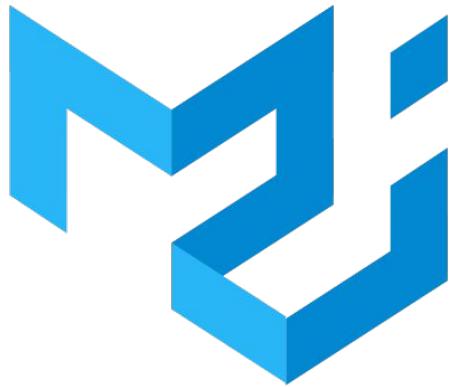
Material Design is a UI library that allows you to easily integrate a highly-engineered set of UI components, and their accompanying style, into any project.

Material Design was created by Google to power the consistently "google" feel across their many applications and websites. It provides easily recognizable interface elements that users are already comfortable with.



Add Material UI to a React Application

- 1 Let's create another React Application we can style using the Material UI Component Library.
- 2 We will practice reviewing by following this [walkthrough](#)
- 3 Follow along as we code together and remember to ask questions if you get stuck.





Solo Exercise:

Add Material UI to a React Application (Lab)



- Choose any React app you've built in the course that could benefit the most from enhanced styling and user-friendly components.
- [Follow along with specific instructions in this repository](#)
- Your goal will be to:
 - Plan the Integration
 - Integrate Material UI
 - Test and review your work
- You may work **independently** or **in group** depending on your preference.



If you get stuck or need some help, we are available to provide assistance and troubleshoot problems.

Recap

- Adding Material UI to a React project
- Making API calls with fetch
- State and Hooks



Any Questions



Solo Exercise:

Daily Exit Ticket

3 minutes



- Please take a moment to give us your feedback after today's course!
- Use the QR code or follow the link: <https://bit.ly/pruMEFc2>



Scan Me!



